UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,300	06/27/2003	Srinivas Doddi	509982005500	9021

7590 01/08/2009

Peter J. Yim
Morrison & Foerster LLP
425 Market Street
San Francisco, CA 94105-2482

EXAMINER	
BROWN JR, NATHAN H	

ART UNIT	PAPER NUMBER
2129	

MAIL DATE	DELIVERY MODE
01/08/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

____

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

____

Ex parte SRINIVAS DODDI, EMMANUEL DREGE,
NICKHIL JAKATDAR, and JUNWEI BAO

____

Appeal 2008-4716
Application 10/608,300[1]
Technology Center 2100

____

Decided: January 8, 2009

____

Before LANCE LEONARD BARRY, ST. JOHN COURTENAY, III, and CAROLYN D. THOMAS, *Administrative Patent Judges*.

THOMAS, *Administrative Patent Judge*.

DECISION ON APPEAL

---

[1] Application filed June 27, 2003. The real party in interest is Timbre Technologies, Inc.

I. STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from a final rejection of claims 1-29 mailed August 11, 2006, which are all the claims remaining in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

A. INVENTION

Appellants invented a system, method, and computer readable storage medium for examining a structure formed on a semiconductor wafer by obtaining a first diffraction signal measured using a metrology device and comparing it to a second diffraction signal generated using a machine learning system. The machine learning system receives input parameters that characterize a profile of the structure to generate the second diffraction signal. When the first and second diffraction signals match within a matching criterion, a feature of the structure is determined. (Spec., Abstract.)

B. ILLUSTRATIVE CLAIM

The appeal contains claims 1-29. Claims 1, 16, and 22 are independent claims. Claim 1 is illustrative:

> 1. A method of examining a structure formed on a semiconductor wafer, the method comprising:
>
> obtaining a first diffraction signal measured using a metrology device;
>
> obtaining a second diffraction signal generated using a machine learning system,
>
> wherein the machine learning system receives as an input one or more parameters that characterize a profile of the

structure to generate the second diffraction signal as an output of the machine learning system;

comparing the first and second diffraction signals; and

when the first and second diffraction signals match within a matching criterion, determining a feature of the structure based on the one or more parameters of the profile used by the machine learning system to generate the second diffraction signal.

C. REFERENCES

The references relied upon by the Examiner in rejecting the claims on appeal are as follows:

Wormington	US 6,192,103 B1	Feb. 20, 2001
Singh	US 6,650,422 B2	Nov. 18, 2003
Kato	US 6,665,446 B1	Dec. 16, 2003
Sirat	EP 0 448 890 A1	Oct. 2, 1991

Mark Gahegan et al., *Dataspaces as an organizational concept for the neural classification of geographic datasets*, Department of Geography, The Pennsylvania State University (1999).

D. REJECTIONS

The Examiner entered the following rejections which are before us for review:

(1) Claims 1-6, 11-14, and 16-29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Singh in view of Wormington.

(2) Claims 9, 10, and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Singh in view of Wormington and further in view of Kato.

(3) Claim 7 is ejected under 35 U.S.C. § 103(a) as being unpatentable over Singh in view of Wormington and further in view of Sirat.

(4) Claim 8 is ejected under 35 U.S.C. § 103(a) as being unpatentable over Singh in view of Wormington and further in view of Gahegan.

II. PROSECUTION HISTORY

Appellants appealed from the Final Rejection and filed an Appeal Brief (App. Br.) on February 12, 2007. The Examiner mailed an Examiner's Answer (Ans.) on June 12, 2007. Appellants filed a Reply Brief (Reply Br.) on August 13, 2007. An Oral Hearing was held at the U.S. Patent and Trademark Office on December 11, 2008.

III. FINDINGS OF FACT

The following findings of fact (FF) are supported by a preponderance of the evidence.

Specification

1. The Specification does not provide a lexicographic definition for the term "machine learning system."

2. The Specification discloses that "diffraction signals used in a library-based process and/or a regression-based process are generated using a machine learning system 118 employing a machine learning algorithm (Spec., ¶[0032]).

3. The Specification discloses that the "machine learning system 118 receives a profile as an input and generates a diffraction signal as an output" (Spec., ¶[0033]).

Wormington

4. Wormington discloses that "[e]volutionary algorithms are used to find a global solution to the fitting of experimental X-ray scattering data to simulated models" (Abstract).

5. Wormington discloses that "it is desirable to fit measured, or experimental, data to a simulated model to determine characterizing parameters of a structure" (col. 4, ll. 65-67).

6. Wormington discloses:

> Referring to the figure, the fitting procedure begins by measuring the X-ray scattering data for a specimen being tested, at step 30. A model for that specimen is then estimated at step 32, . . . Once the model has been estimated, the X-ray scattering for that model is simulated at step 34, using known methods . . . to produce a characteristic curve. The differences between the values for that curve and the data which was measured at step 30 are determined at step 36, . . . At step 38, a determination is made whether the error value is less than a threshold value T. If it is not, one or more parameters of the model are adjusted at step 40. . . . After the model parameters have been adjusted, steps 34, 36 and 38 are repeated.

(Col. 6, ll. 5-32.)

IV. PRINCIPLES OF LAW

"What matters is the objective reach of the claim. If the claim extends to what is obvious, it is invalid under § 103." *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1742 (2007). To be nonobvious, an improvement must be "more than the predictable use of prior art elements according to their established functions." *Id.* at 1740.

Appellants have the burden on appeal to the Board to demonstrate error in the Examiner's position. See *In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) ("On appeal to the Board, an applicant can overcome a rejection [under § 103] by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.") (quoting *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)). Therefore, we look to Appellants' Brief to show error in the proffered prima facie case. Only those arguments actually made by Appellants have been considered in this decision. Arguments which Appellants could have made but chose not to make in the Brief has not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

V. ANALYSIS

Grouping of Claims

In the Brief, Appellants argue claims 1-29 as a group (App. Br. 5-7). For claims 2-29, Appellants repeat the same argument made for claim 1. We will, therefore, treat claims 2-29 as standing or falling with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(vii). *See also In re Young,* 927 F.2d 588, 590 (Fed. Cir. 1991).

The Board's Claim Construction

"Our analysis begins with construing the claim limitations at issue." *Ex Parte Filatov*, No. 2006-1160, 2007 WL 1317144, at *2 (BPAI 2007). Claims are given their broadest reasonable construction "in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004).

"Without evidence in the patent specification of an express intent to impart a novel meaning to a claim term, the term takes on its ordinary meaning." *Optical Disc Corp. v. Del Mar Avionics*, 208 F.3d 1324, 1334 (Fed. Cir. 2000). Here, Appellants have not presented any evidence to show that the phrase "machine learning system" includes a novel meaning in the specification. Therefore, we shall adopt the ordinary meaning of "machine learning system" which includes a system that receives a profile as an input and through employing a machine learning algorithm generates desired outputs (FF 1-3).

The Obviousness Rejection

We now consider the Examiner's rejection of claims 1-29 under 35 U.S.C. § 103(a).

Appellants contend:

> Note, claims 1, 16, and 22 do not merely recite that the second simulated diffraction signal is generated as an output, or that the machine learning system is used in generating the second simulated diffraction signal. Instead, claims 1, 16, and 22 expressly recite that the output of the machine learning system is the second simulated diffraction signal.

(App. Br. 5.)

Appellants further contend that "the Examiner must establish that the X-ray scattering disclosed in the Wormington reference is generated <u>as an output of the genetic and evolutionary algorithms</u>" (App. Br. 6). Appellants also contend that "the simulated x-ray scattering data is the output of the 'calculating' step rather than the 'modifying the model' step in which the evolutionary algorithm is used" (Reply Br. 6). Further,

Appellants contend that "[r]egardless the number of times that the loop is completed, the Wormington reference does not disclose the use of genetic algorithms at steps 32 or 34 to output X-ray scattering" (Reply Br. 9).

The Examiner found that "step 34 is functionally part of the genetic algorithm. Thus, the data representing two (or more) X-ray scatterings (or diffraction signals) is clearly a result of computations inside the genetic algorithm of Wormington's invention and *could* be indicted to be the output of the genetic algorithm with the appropriate flowchart symbol" (Ans. 12).

Issue: Whether Appellants have shown that the Examiner erred in finding that Wormington's step 34 which outputs that X-ray scattering curve is functionally apart of the genetic algorithm, i.e., included in the machine learning system?

Initially, we note that the Examiner has found, and Appellants do not dispute, that Wormington's genetic and evolutionary algorithms (e.g., Fig. 4, step 40) are machine learning algorithms (Ans. 3). However, Appellants contend that because the Examiner has equated Wormington's evolutionary algorithm at step 40 as a learning algorithm, the Examiner must further establish that the X-ray scattering disclosed in the Wormington reference is generated as an output of step 40, instead of step 34.

In other words, Appellants argue that because the Examiner has construed Wormington's step 40 as a machine learning algorithm, to read on the claimed language, the X-ray scattering signal must come directly from Wormington's step 40. We disagree.

Firstly, we are unaware of any authority holding that we are bound by an Examiner's determination as to claim construction. As noted *supra*, we construe a "machine learning system" as including any system that receives a profile as an input and through employing a machine learning algorithm generates desired outputs. We further note that such a "system" could embody a single unit or multiple units. Appellants' claim 1 does not limit its "*machine learning system*" to a particular embodiment. All that is required is that a "learning algorithm" by used therein. Further, the term "system" in itself suggests "a *group* of interacting bodies under the influence of related forces." *Merriam-Webster's Collegiate Dictionary,* p. 1269 (11th ed. 2003).

Secondly, the Examiner found that step 34 could be functionally apart of the genetic algorithm (Ans. 12) and that the boundary of the genetic algorithm does not end at step 40 (Ans. 11). We agree.

Appellants claim "a machine learning system" not merely a learning algorithm. Thus, we note that although Appellants argue that the X-ray scattering data must be an output of Wormington's step 40, Appellants have chosen to draft the claims, claim 1 in particular, far more broadly.

Wormington's system uses an evolutionary algorithm to find X-ray scattering data (FF 4) which is thereafter used to determine characterizing parameters of a structure (FF 5). In other words, Wormington's Fig. 4 discloses measuring the X-ray scattering data for a tested specimen, estimating a model for that specimen, simulating the X-ray scattering using known methods, determining the difference between the simulated and measured curves, determining whether an error value is less than a threshold value, and if not, adjusting one or more parameters of the model and repeating the steps (FF 6). As such, Wormington discloses a *system* that

receives a profile as an input and through employing a machine learning algorithm generates desired outputs. Therefore, we find that the claimed *"the second diffraction signal as an output of the machine learning system"* reads on Wormington's Fig. 4.

Even though, in some instances, we sustain the examiner's rejections for different reasons than those advanced by the examiner, our position is still based upon the collective teachings of the references and does not constitute a new ground of rejection. *In re Bush*, 296 F.2d 491, 496 (CCPA 1961); *In re Boyer*, 363 F.2d 455, 458 n.2 (CCPA 1966).

Therefore, we do not find that Appellants have shown error in the Examiner's rejection of illustrative claim 1. Instead, we find the Examiner has set forth a sufficient initial showing of obviousness. Therefore, we affirm the rejection of independent claim 1 and of claims 2-29, which fall therewith.

VI. CONCLUSIONS

We conclude that Appellants have *not* shown that the Examiner erred in rejecting claims 1-29.

Thus, claims 1-29 are not patentable.

VII. DECISION

In view of the foregoing discussion, we affirm the Examiner's rejection of claims 1-29.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv) (2007).

<u>AFFIRMED</u>

msc

PETER J. YIM
MORRISON & FOERSTER LLP
425 MARKET STREET
SAN FRANCISCO CA 94105-2482